Network Simulation with TCL Script Generator for NS-2

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Abstract
Simulation domain use or create Tcl scripts to set up a wired or wireless communication network, and then run these scripts via the NS-2 for getting the simulation results. Tcl scripts are widely used in NS-2 simulation tool. We have developed a new Tcl script generator tool, named "TCL Script Generator", to permit users to create Tcl scripts file in a direct and easy manner and it has GUI. This tool has friendly interface to set wired or wireless communication network parameters. After the parameters are entered, the tool automatically generates Tcl scripts file, which can be run in NS-2 network environment for getting the simulation results for the network being studied. The focus of this paper is on the Tcl script generator, its development and we introduce the specific characteristics of "Network simulation with TCL Script Generator" and discuss its features compared with NSG-2 (NS-2 Scenarios Generator2).
**Keywords:** *Tcl Script Generator, Ns-2 Simulator, Nsg2.1.*

1. INTRODUCTION

Network design brings up many questions from about standards and producers of equipment which leads to efficiency of future network. Designers use special software to solve problem but simulation is the most accessible and productive way to achieve efficiency of a network on the stage of its designing. All simulators have a similar set of capabilities with some differences in programming language for user functions, user interface etc. Network simulation is without a doubt one of the most predominant evaluation methods in communication networks. It is widely used for the development of new communication architectures and network protocols Network simulator ns2 is the most popular open source discrete event simulator, effective and extensible simulation tool used for networking research and educational use. Using NS-2 we can implement

our new protocols and compare its performance to TCP. Tcl scripts are being used more attention by researchers. NS-2 is an open source discrete event simulator used by the scientific community for network research [1]. It was developed at University of California at Berkeley. It can support both wired and wireless networks, and simulate several network protocols such as TCP, UDP, multicast routing, etc. Aim of our project is to develop graphical user interface for purpose to reduce time for model creating and to avoid common pitfalls and aid user in creating TCL script file in flexible manner which run in NS2.The efficiency of building and use of network became an extremely urgent task. Low price of its designing, its conformity and scalability serve as a criterion for its efficiency. Networks are a basis of all information systems of the business. So the

requirements to network performance considerably grow. Features of the application:

- Providing GUI For Generating Script
- Converting model from graphical notation into TCL Script
- Run TCL script in NS2
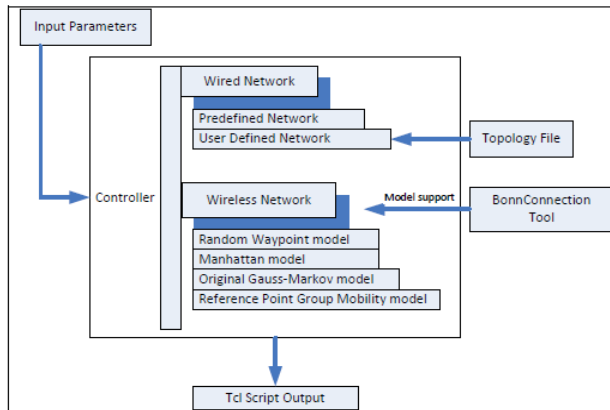
2. NSG 2.1 VERSES TCL SCRIPT GENERATOR

2.1- NSG 2.1

NS-2 Scenarios Generator 2 (NSG2) [2] is developed by Peng-Jung Wu at national Sun Yat-Sen University, Taiwan. It supports wired and wireless scenario by creating nodes and links using drag and drop option (It provides some GUI).

The limitations of the NSG2.1 are support limited number of protocol, not well distinguish between topology present in wired world i.e. Ring, Star, Mesh, Line etc, not well distinguish between models present in wireless scenario steps for generating scenarios are not clear and do not provide any kind of help for understanding GUI system.

2.2 TCL Script Generators

TCL Script Generator is tool which generates the TCL script file. This also supports two type of communication i.e. wired and wireless communication. The architecture of Tool Generator is shown below. It consist of five main blocks parameters to input, controller, Bonn connection tool,

Topology file, TCL script file which is generated The TCL Script Generator has friendly interfaces to interact with user.

It accepts the parameters for wired and wireless communication from user. These parameters are useful for generating the TCL script. It supports predefined and user defined topology. We provides line, ring, mesh, star, random mesh, full mesh topology. In the wireless cases, we include four mobility models in TCL Script Generator: Random Waypoint Model [2], Manhattan Model, Original Gauss-Markov model and Reference Point Group Mobility model.
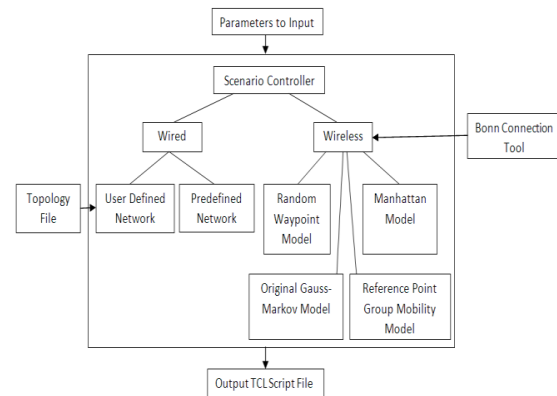

Figure 1.TCL Script Generator Architecture

I) Bonn Connection: This is a tool used to generate mobility models such as Random Waypoint Model or Manhattan Model. It is a Java-based software tool which creates and analyzes the mobility scenarios. It serves as a tool for investigation of mobile ad hoc network characteristics. The scenarios can also be exported to the NS-2 network simulator. System Tool imports the ns-movement file from Bonn Connection when implementing the wireless communication.

II) Input Parameters

We generate one Java Server Page (JSP) for each model to enter the input parameters and submission of these parameters to JSP page supports the verification of the input parameters format and values. If the parameter values are out of range, the system will alert the users and prevent them from entering the parameters. Some of the parameters are required for creating the Tcl scripts and if user does not specify these

parameters, the system automatically set them to the default values.

III) Controller The Controller is a core part of the system and acts as its brain. The function of controller is to deal with the parameters, allocate the tasks, and monitor the entire data flow. The controller steps are specified below.

IV) Topology File Generator Topology File Generator is only used in user defined wired networks. User can create a text topology file for describing the node connections before uploading this file into system.

3. CONCLUSIONS

In this paper, we are presenting our structure as "Network Simulation with TCL Script Generator for NS-2" which is somewhat same as previous NSG2.1 but we are providing some other additional feature along with reasonable GUI. These systems help the user working on project without programming, gives user-friendly results representation,

result analysis, and helps to avoid common pitfalls. This system can be further extended for multiple applications as follows

- Support to satellite simulation
- Error model
- Intelligent vehicle tracking

Topology File Generator is only used in user defined wired networks. User can create a text topology file for describing the node connections before uploading this file into system.System Tool has friendly interfaces to interact with users in order to collect lots of parameters for wired or wireless communication network.

Discrete-event network simulation is a powerful research tool for investigating protocol design, protocol interactions. While simulation is not the only tool used for data networking research, it is extremely useful because it often allows research questions and prototypes to be explored at many orders-of-magnitude less cost and time than that

required to experiment with real implementations and networks.

ADVANTAGES OF NSG:

1) Open source TCL script generator which generates wired and wireless scenario.
2) Support adhoc routing protocol.
3) Simple to use as compared to TCL\TK

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